

Mathematics

3 Points – 2nd Exam

מ ת מ ט י ק ה

3 יחידות לימוד – שאלון שני

Instructions

א. Duration of the exam: One and a half hours

ב. Exam structure and breakdown of points:

This exam has six questions.

Each question is worth 25 points.

You may answer as many questions as you like, completely or partially, but the maximum number of points you can earn is 100.

ג. Material that may be used during the exam:

- (1) A non-graphing calculator. You may not use the programming options of a programmable calculator. Use of a graphing calculator or programming options may lead to the disqualification of your exam.
- (2) Formula sheets (attached).
- (3) A Hebrew-foreign language / foreign language-Hebrew dictionary.

ד. Special instructions:

- (1) Write all your calculations and answers in the **Hebrew exam booklet**.
Do not write in the shaded margins.
- (2) Explain all your work, including calculations, in detail and in a clear and organized fashion. Lack of detail may lower your score or lead to the disqualification of your exam.
- (3) For draft paper, use the pages in the **Hebrew exam booklet**. Use of other draft paper may lead to the disqualification of your exam.

Note: At the end of the Hebrew exam booklet there is draft paper. Do not add any other pages.

הוראות

א. משך הבחינה: שעה וחצי.

ב. מבנה השאלון ומפתח ההערכה:

בשאלון זה שש שאלות.

לכל שאלה – 25 נקודות.

מותר לכם לענות, באופן מלא או חלקי, על מספר שאלות כרצונכם, אך סך הנקודות שתוכלו לצבור לא יעלה על 100.

ג. חומר עזר מותר בשימוש:

- (1) מחשבון לא גרפי. אין להשתמש באפשרויות התכנות במחשבון שיש בו אפשרות תכנות. שימוש במחשבון גרפי או באפשרויות התכנות במחשבון עלול לגרום לפסילת הבחינה.
- (2) דפי נוסחאות (מצורפים).
- (3) מילון עברי-לועזי/לועזי-עברי.

ד. הוראות מיוחדות:

- (1) יש לכתוב את כל החישובים והתשובות ב**נוסח העברי של השאלון**.

אסור לכתוב על הפסים שבשוליים.

- (2) יש להסביר את כל הפעולות, כולל חישובים, בפירוט ובצורה ברורה ומסודרת.

חוסר פירוט עלול לגרום לפגיעה בציון או לפסילת הבחינה.

- (3) לטיוטה יש להשתמש בדפים שב**נוסח העברי של השאלון**. שימוש בטייוטה אחרת עלול לגרום לפסילת הבחינה.

שימו לב: בסוף הבחינה מצורפים דפי טיוטה.

אין להוסיף דפים אחרים למחברת הבחינה.

Good Luck!

בהצלחה!

Questions

This exam has six questions. A complete answer is worth 25 points. You may answer as many questions as you like, completely or partially, but the maximum number of points that you can earn in this exam is 100.

Write all your calculations and answers in the Hebrew exam booklet.

Note: Explain all your work, including calculations, clearly and in detail.

Lack of detail may lower your score or lead to the disqualification of your exam.

Algebra

1. Consider the parabola $y = x^2 - 7x + 10$.

A and B are the points of intersection of the parabola with the x-axis, as shown in the figure to the right.

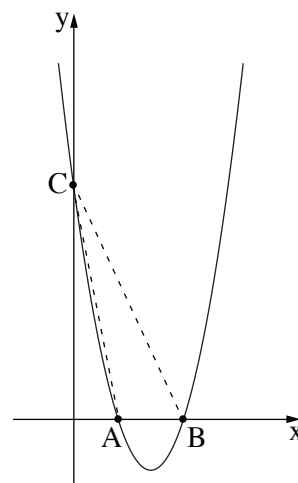
C is the point of intersection of the parabola with the y-axis.

א. Find the coordinates of Points A, B, and C.

ב. Find the area of Triangle ABC.

ג. Find the negative interval of the parabola.

ד. Is the point $(-1, 18)$ located on the parabola? Explain.



2. Tomer and Shachar learned 352 new words for an English test.

They both began studying for this test on the same day.

On the first day, Tomer learned 12 words, and then on each of the subsequent days, he learned 4 more words than he had learned on the previous day.

א. How many words did Tomer learn on the fourth day?

ב. In how many days did Tomer finish learning all the words for the test?

Shachar learned 32 words every day.

ג. Did they both finish learning all the words for the test on the same day? Explain.

3. Plant A is a bottle-recycling facility.

Every year the number of bottles recycled in Plant A increases by 4% .

In the year 2000 , Plant A recycled 500,000 bottles.

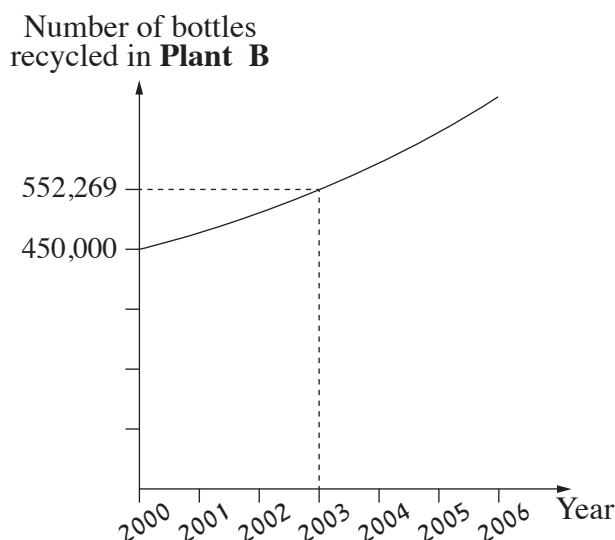
א. How many bottles did Plant A recycle in 2006 ?

Plant B is also a bottle-recycling facility.

The number of bottles recycled in Plant B increases by a fixed percentage each year.

The graph below describes the number of bottles recycled in Plant B by year.

Use the graph to answer Items ב–ג (below the graph).



ב. (1) How many bottles were recycled in Plant B in 2000 ?

(2) How many bottles were recycled in Plant B in 2003 ?

ג. By what percentage does the number of bottles recycled in Plant B increase each year?

At the beginning of 2006 , the Ministry of Environmental Protection announced that any plant that recycled more than 600,000 bottles that year would be given a bonus.

ד. Determine whether each of the plants (A and B) will receive the bonus. Explain.

Trigonometry

4. The figure to the right shows Square ABCD .

Point N is the midpoint of Side AD .

Given: The side length of the square is 13 .

א. Find the size of Angle NCD .

Point F is located on Side CD .

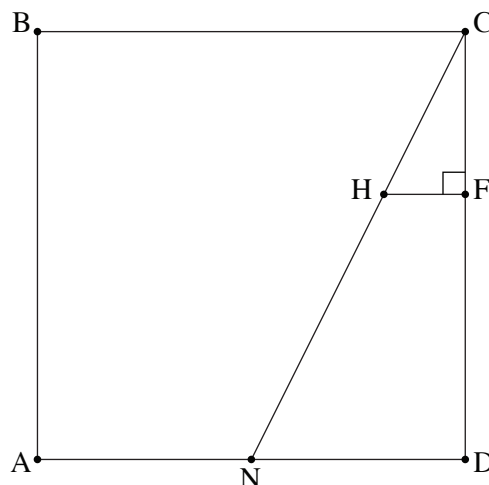
Point H is located on Side CN .

Segment HF is perpendicular to Side CD (see figure).

Given: $CF = 5$.

א. Find the length of Segment CH .

ג. Find the length of Segment NH .



Probability and Statistics

5. The figure to the right shows a balanced spinning top with 4 sides.

Each of the spinning top's sides is marked with a number.

3 of the spinning top's sides are marked with the number 5 ,

and one of the spinning top's sides is marked with the number -5 .

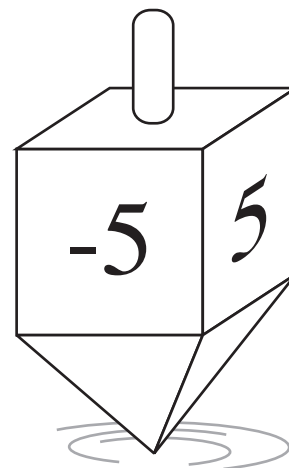
א. The top is spun once. What is the probability that the number obtained will be 5 ?

The top is spun twice.

א. What is the probability that the sum of the two numbers obtained will be 10 ?

ג. What is the probability that the sum of the two numbers obtained will be 0 ?

ד. What is the probability that the product of the two numbers obtained will be 25 ?



6. In a large factory, the employees' salaries have a normal distribution.

The average monthly salary of an employee at this factory is 9,200 shekels.

The monthly salary of 31% of the factory's employees is greater than 9,600 shekels.

א. Find the standard deviation of the monthly salaries at this factory.

ב. What percentage of the factory's employees have a monthly salary of less than 8,000 shekels?

The monthly salary of 8 of the factory's employees is greater than 10,800 shekels.

ג. According to the normal distribution curve, how many employees does this factory have?

The factory's management decided to pay a one-time bonus of 500 shekels to each employee whose salary was equal to or lower than the average salary.

ד. According to the normal distribution curve, how many shekels in total did the factory's management pay to these employees?

Below is the normal distribution curve from the formula sheet. Use it in your calculations.

